



# MAGAZINE

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## CONTENTS

Canteen Facts and Figures, by W. J. Willmoth	182
Sporting Parade—Chris Winn	186
News in Pictures	188
Modern Marvels—X-ray Crystallography	194
Textile Printing in the East, by William Clarke	196
Central Council, by the Editor	202
People and Events	206
Name, Rank and Number, by Roy Shirley	210

FRONT COVER: *Running Before the Wind*, by L. J. Bal, I.C.I. (Holland) N.V.

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# Canteen Facts and Figures

By W. J. Willmoth, I.C.I. Chief Catering Adviser

I.C.I.'s catering services cost the Company about £1m. a year. Roughly half of this is to meet the deficit in running expenses and the other half to meet overheads and depreciation of capital. But this large sum is not spent haphazardly: it is the result of careful planning and a deliberate decision to provide as cheaply as possible good food and good places to eat it in.

**T**ODAY, and every working day this year, 40,000 meals (not to mention innumerable cups of tea and coffee) will be served in I.C.I. works and office canteens up and down the country. Forty thousand meals a day amount to well over 9½ million meals a year—a big business by any standards, and one that is costing the Company, in canteen trading deficits and indirect expenses, little short of £1,000,000 a year.

At Central Council a few weeks ago it was announced that modest increases—2d. for a three-course meal and proportionate amounts for smaller meals—would have to be made next month to the charges that have ruled in I.C.I. canteens for the past six years, during which time the cost of living index has risen by over 20%. These increases are not likely to affect the Company's subsidy to canteens; what they will do, it is hoped, is to maintain the standard of the meals in a world of rising prices. And perhaps this rare event of an increase in the meal charges is as good a time as any to explain a little of what goes on behind the scenes in the I.C.I. catering services.

I.C.I. has been well to the fore in providing for its employees good food and good places in which to eat it. We have a Company-wide catering service of which we can be proud, and which includes kitchens and dining rooms that are not only pleasant to eat in but a joy to work in. This development has naturally taken many years. For a time there was difficulty in obtaining the necessary building licences, and even when building restrictions were removed the allocation of the many millions of pounds of capital involved

was no light matter. The capital cost of the building, moreover, and of the equipment—refrigerators, ovens of many kinds, grills, boilers, fryers, tea and coffee makers, dish-washers, mixers, choppers, slicers, silver, china, glass, linen, tables, chairs—is only the beginning of the story. As in any manufacturing plant, this capital equipment must be operated and kept

clean and in good working order. To do this I.C.I. has more than 2500 people directly employed in its catering service, including many highly skilled craftsmen and women—chefs and cooks, butchers and bakers, for example—without whose talents the shiniest kitchen and the most up-to-date equipment would be useless.

The standards of catering provided vary from the usual three-course midday meal and the works cup of tea to a full-scale banquet. One small office establishment caters for only eighteen people, another for only forty—but the service provided is as important to them as that provided by the larger catering units for 3000 people a day. At one place meals may be served in an office basement, at another in the beautiful restaurant on the ninth floor of a new office block. The excellent restaurant in Imperial Chemical House, London, was once regarded as something rather special, even for I.C.I. But such a standard has now become commonplace, exemplified in such kitchens and dining rooms as those built at Alderley Park, Wilton, Blackley, Harrogate and elsewhere.

This programme can be traced back to the war years. Government regulations laid down that all large industrial establishments should have canteens,



The kitchen at the Alderley Park restaurant of Pharmaceuticals Division



but the I.C.I. Board had decided as early as 1942 the broad terms of an operating policy whereby so far as was practicable good catering facilities were to be provided for *every* works, enabling employees to have a hot meal every day if they wished. The Board's close interest in this service continues, and it is now a matter of course that when a new factory or a new office block is being planned the catering requirements should be considered from the start.

### *Wilton Example*

Take Wilton as an example. Catering had to be planned to keep pace step by step with developments on the site from the time the first pegs were driven into the ground. First the kitchens at Wilton Castle had to be reorganised to cater for the first nucleus of staff. Secondly, for the engineers developing the site, a staff canteen had to be built. As plants were completed and started to operate, the Piccadilly Restaurant followed—then the Grange, 'Terylene,' Trinity and Thorntree restaurants. These buildings have had to be enlarged or adapted to suit changing circumstances, and as the site expands further so will the catering facilities. The same chain of development will no doubt be followed at Severnside, a very small ancillary service evolving gradually into a catering unit of very considerable size.

### *The Manager's Job*

But, of course, the best buildings in the world, equipped with the most elaborate food-preparing machinery, do not make a good restaurant. In the end it is the quality of the manager and his staff that counts. In the long days of rationing it was a comparatively easy matter to manage an industrial canteen, provided one could find the rations and the staff to prepare them. Supplies were controlled, prices were controlled, and the customers accepted what was given them—there was little alternative. Now that ample foodstuffs are available (at a price!) and canteens are no longer in the preferential position that resulted from rationing, the manager's job has again become a highly skilled one. It calls for expert knowledge not only in preparing and cooking the food, but in purchasing, menu-planning, and training and supervising staff.

A few years ago it became apparent in I.C.I. that to ensure really efficient canteen management the Company would have to be more specific in its instructions to local catering managements, and yet ensure that the acid test of success remained the satis-

faction of the customer by providing a reasonably attractive meal at a reasonably attractive price. How could this be done? What basis of operation would be equally fair to both large units and small? If the one constant factor was the purchase of food, the larger units would be able to buy more economically than the small, and would therefore be more favourably placed. It was finally decided that each unit would be set an individual target, allowing them to spend on food an agreed percentage of their net takings for meals, the targets varying according to the size of the units. Thus, the more efficient the management in their purchasing and use of food, the better the meals should be. On an average, 80% of the price charged for a meal is spent on food. This means that by far the greater part of the forthcoming increases in meal charges will go towards the actual cost of the materials.

### *Improvements from Work Study*

This was one step towards more efficient management of canteens. Another approach has been the use of work study. Joint teams of work study officers and caterers have looked closely into our operations with the object of finding better and more efficient methods of working. Such studies take a long time to make and a long time to bear fruit, but it is true to say that progress has already been made, and in many units, varying from very large restaurants to quite small tea stations, improvements in layout and working conditions have resulted.

But however efficient a canteen's management and however scientific its layout, it can only be counted a



The dining room at Britannia House, Birmingham, headquarters of the Midland Sales Region. This is one of I.C.I.'s newest restaurants.

failure if the food is not properly prepared and cooked by well-trained catering staff. To recruit staff fully trained has never been easy, and I.C.I. has instituted various training schemes for junior catering staff. Some attend weekly lecture demonstrations, whilst others are given more intensive training in selected kitchens.

### *A New Training Scheme*

Recently we have introduced another scheme—quite a new departure for I.C.I.—which provides two full years of training spread over no fewer than eight different catering establishments in Head Office and the Divisions. The first three students, recruited from catering schools, have just started their practical training under this scheme. One is spending his first three months in Metals Division, learning the craft of butchery—which includes everything from meat processing to meat costing. At the same time he will

be gaining experience in bar control (recreation clubs are thirsty places) and in providing special functions such as long service award dinners. Another student started his training with Nobel Division, and will concentrate on work in the Central Bakery, Central Butchery, and in the kitchens of the new Central Restaurant. And the third has gone to Dyestuffs Division headquarters at Blackley for training in the kitchens and dining rooms at New Hexagon House.

Later they will all be instructed in stores control, daily costing, pre-costed recipes, menu planning, bulk beverage preparation, and control of tea-trolley rounds, cafeteria and waitress service and general dining room supervision. Training at Head Office will include a study of the Company's catering policy and the effect of food cost movements on trading accounts, the study of drawings of new catering projects, an appreciation of the techniques of work study, and a course in emergency feeding.



# CHRIS WINN

By Denzil Batchelor

IF you are extended on a psychoanalyst's couch and the name Chris Winn is spoken, your immediate response will be the words "Rugby football." In that first second you will not have time to remember that he was a cricketer too, for to many of us the sight of his tall, lean figure, with the fair hair streaming like a flag, stands out in post-war years as a very symbol of the winter game.

He began his Rugby with no appropriate feeling of vocation. He was an eight-year-old schoolboy at Cranleigh Junior School, and played soccer and hockey with equal zest, whichever game he happened to shine at on any particular afternoon becoming his favourite for the time being.

They put him at full-back, stand-off half or centre—anywhere but at wing three-quarter, where indeed he was not to play regularly until he had left his public school, King's College, Wimbledon, and won his place in the Sussex side. After that, honours came thick and fast. He played for Rosslyn Park; for Oxford, helping to beat Cambridge at Twickenham; for the Oxford and Cambridge touring side in South Africa; for the Barbarians; and—eight times—for England.

He scored six tries for his country—one against South Africa in that tremendously hard-fought match in which both sides with conversion kicks hit the same goalpost in the same place. (The South African kick wriggled over; the English kick didn't. If it had been the other way about, we should have drawn the game.) He rates that performance as one of his two best games; the other was the 16-all drawn match for the Oxford and Cambridge tourists against the Combined Universities in South Africa, a side good enough to challenge any international team. This was the ding-dong epic in which there were only twenty-five scrums and under forty line-outs.

Once he scored the winning try against Wales, and was the one man dropped from the team. "It was the only sporting occasion on which I came near to showing emotion," he admits. "But on reflection I came to the conclusion that the selectors were justified."

His great gifts as a player as I remember them were his thunderclap tackling, his determination when given a pass with the corner flag in his sights, and a pair of hands which had gained their *expertise* through his efforts as a



A hit for 4 off Wardle (Yorks)

cover point. These high qualities got their chance to serve their country when W. P. C. Davies dropped out of a Final Trial through injury; Winn was picked to fill the side, and played well enough to be chosen against Wales.

You don't get to the top without guidance and encouragement. In his case these came from Geoffrey de la Condamine at his public school; from Frank Lyall of Rosslyn Park; from association with members of the Oxford and Universities' teams; and from the example of his elder brother, David—"The best player in the family until he was injured in the Services."

He believes that a boy is old enough to learn Rugby as soon as his physical development permits and when he first feels an enthusiasm for the game. He must *learn* the rudiments: "The Welsh are far and away the best at teaching them." And he would like to see the captain of an international team picked for the whole season and co-opted on the Selection Committee.

For my part I would like to see Chris Winn as an England Selector.

Of course, there is also his cricket, which has I think enriched his life with an almost mystical joy. Winn was one of the whirlwind cover points of his generation. Had it been this gift, I asked myself, that had carried him into the Oxford University team as a freshman, to play four times against Cambridge? You see, the point was Winn came from King's College School, Wimbledon, not a school whose old boys were likely to get chances to attract the university captains and gain blues in their first year.



Under pressure in the mud at Twickenham (England v. South Africa)

Chris Winn's explanation, when we lunched together at Paints Division, was an object lesson to anyone with a son ambitious for a place in the sun at Lord's. He was discovered by the late Andy Kempton, that indefatigable Surrey talent scout and coach. It was Kempton who drummed into him a lesson important enough to win a blue. "You may make a duck in the first innings and be bowled first ball in the second, but don't forget that your fielding can be worth fifty runs in each innings to your side."

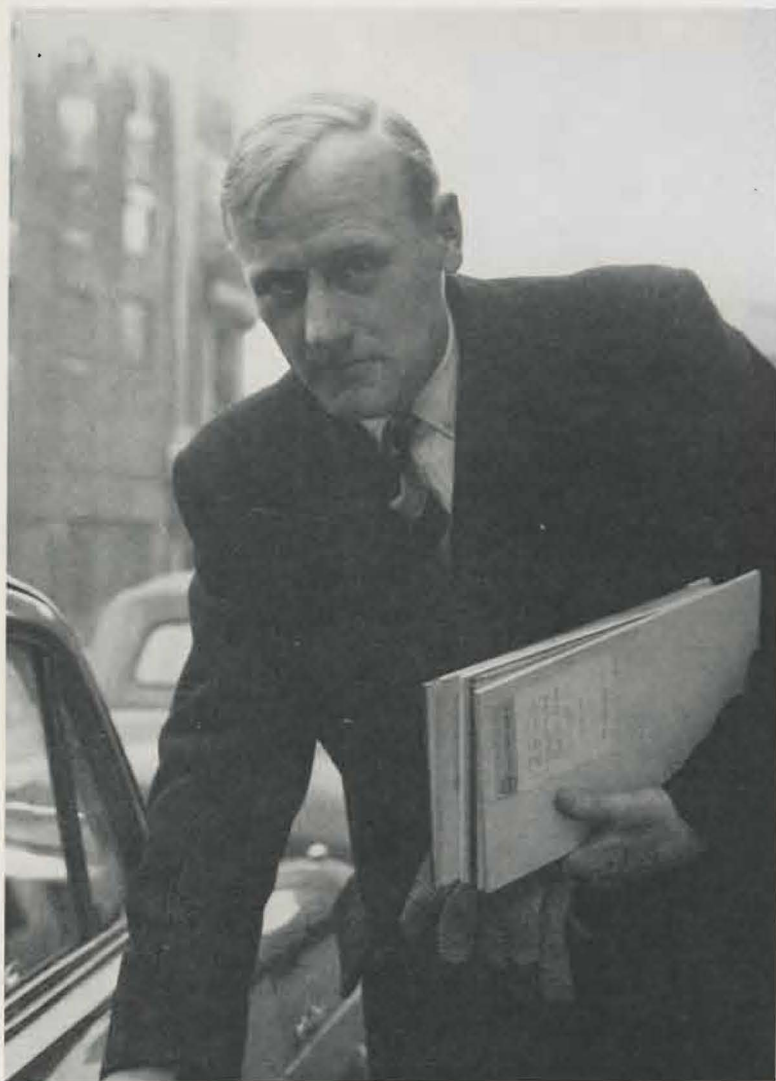
"So it was the fielding that did it?"

"As a matter of fact it was luck."

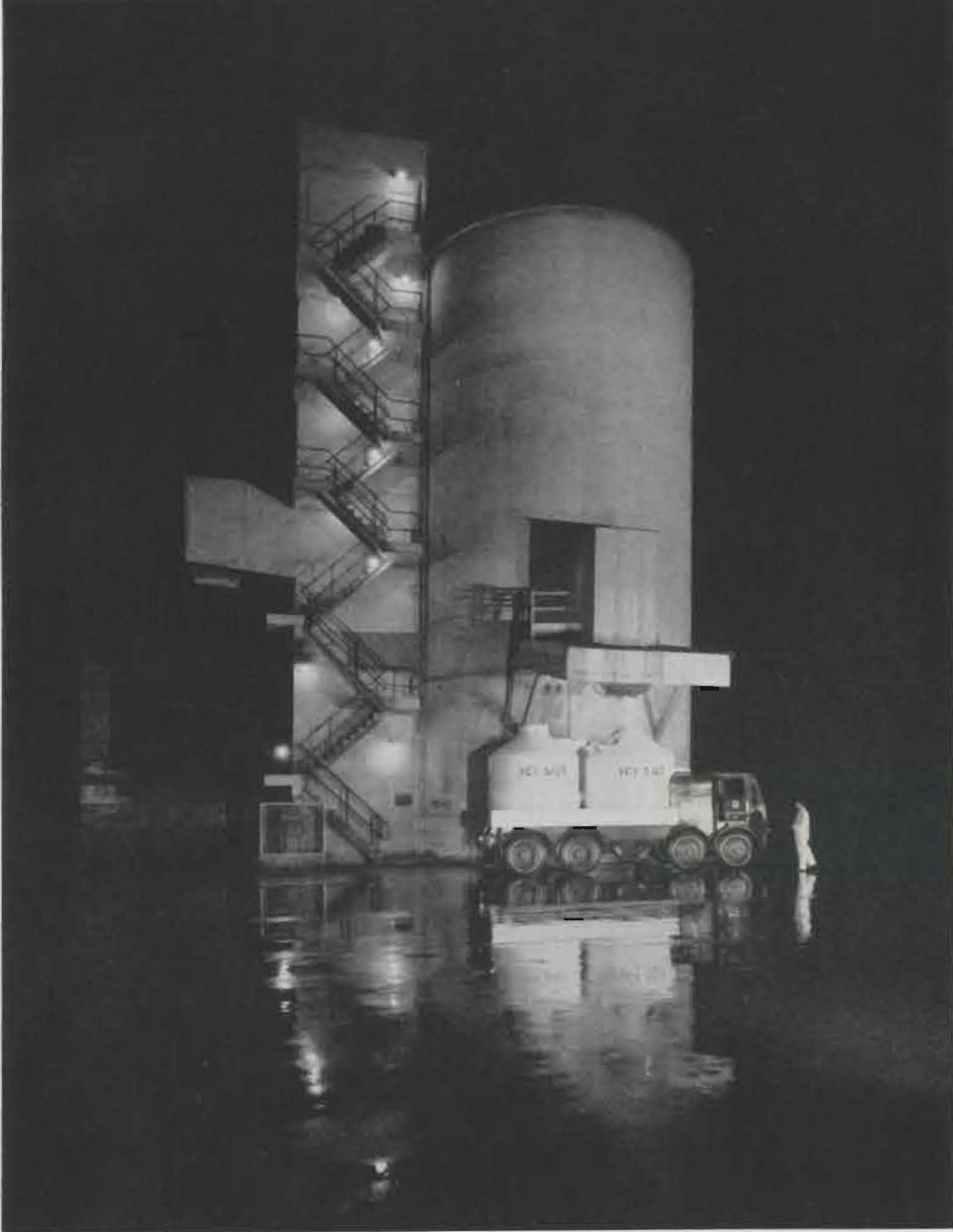
And he told me the story of the crucial match of his career. It was in 1948, in his first summer term at Oxford, when the University team was short of an opening batsman as late as the last home match of the season. A letter came from Kempton to the cricket authorities, and as a result it was agreed to try young Winn for this key position at the eleventh hour. I suppose men have played in the team before for the first time as late as that and gone on to win their blues, but I cannot think of any.

Well, it was Winn's great chance. He walked out to that beautiful Oxford wicket, ringed round with chestnuts and copper beeches and with the stripling river just beyond its fringe, and was delighted to see a white butterfly jinking across the pitch. Not every butterfly in Oxford, then, was in his stomach.

He had made two when he hit the simplest catch in the history of Christendom into the slips, and began to step out for the pavilion and lifelong oblivion. And then he stopped—the easiest catch in the world had been dropped! He stayed on to make forty—indeed, he stayed on in the side to score runs against Surrey and the M.C.C. and to play at Lord's. Andy Kempton's other piece of advice had borne fruit: he had learned that you only have to play one ball at a time, and that the ball you have just mis-hit is as much a part of the past as the Sphinx or the Hanging Gardens of Babylon.







**Salt silo.** A striking night scene at Winsford Works. Our picture shows salt being loaded into an air discharge bulk delivery vehicle from a 1000-ton dried salt silo. This system allows loading to continue all round the clock. The silo has been in operation just a year

# NEWS IN PICTURES

## Home and Overseas



**At Central Council.** Above: Sir Alexander Fleck, Chairman of I.C.I., talks with two distinguished guests at Scarborough, Sir John Braithwaite, who was chairman of the Stock Exchange (centre), and Sir James Bowman, chairman of the National Coal Board. Below: Sir Alexander presents the Safety Trophy to Dr. S. W. Saunders, chairman of Heavy Organic Chemicals Division, and congratulates the Division on winning the trophy so early in its history. Right: On the occasion of her 28th and last Central Council, Miss E. Webster (Central Labour Dept.) thanks members of the Council for their gifts presented on her approaching retirement



**Football fans.** Lord McGowan, Honorary President of I.C.I., chats with Field-Marshal Viscount Montgomery in the royal box at Wembley at last month's Cup Final between Notts Forest and Luton. Behind them, straboatered, is the Chancellor of the Duchy of Lancaster, Dr. Charles Hill, M.P. for Luton, and Mrs. Hill







"Calcium" (left), Alkali Division's new 800-ton coaster, was named by Mrs. G. A. Richmond, seen below with her husband, the Division's Director, at the recent launching ceremony at Goole, Yorkshire. It will carry 580 tons of limestone, and will normally operate between Fleetwood, Glasgow, Belfast, and North Wales.



Mr. J. Bennetts (Metals) has been awarded the Royal Humane Society's Resuscitation Certificate. When a drowning man was brought ashore in Cornwall last year, although his breathing and heartbeats had apparently stopped, Mr. Bennetts' prompt and unceasing efforts with artificial respiration restored the man to life.



**Paints in Bahrain.** At Bahrain's recent Agricultural Show and Trade Fair, Paints Division's agents, Messrs. A. A. Zayani & Sons, won first prize for the best commercial stand. Our picture shows the Ruler, Sheikh Sulman bin Hamed Al Khalifa, presenting the prize cup to the son of Mr. Rachid Zayani, the managing director of the firm.



A handshake for David Wilson (Wilton Works) from Yorkshire skipper J. R. Burnet when the Redcar team, in which two Wilton men played, met recently for the traditional cricket match with a Yorkshire county team. The other Wilton man is Tom Gray, 17-year-old Wilton Works apprentice (third from left), and the familiar figure on his right is Freddy Trueman.



Mr. Ernest Marples, the Postmaster-General, admires an exhibit at the "Tailor and Cutter" exhibition held recently in London. Three major awards were won by exhibitors using 'Terylene' wool cloth, and the new 'Terylene' Trophy, presented by Fibres Division, went to Helman of Bruton Street for a 'Terylene' wool dinner jacket. A nice compliment to I.C.I.—the Postmaster-General sported a 'Terylene' suit for the occasion.



**I.C.I. v. Harrogate.** A tense moment for C. E. Mitchell (Fibres Division) (left) and M. R. M. Evans (Northern Region) during the annual match between a combined I.C.I. team and Harrogate Rugby Club. For future matches Mr. John Beal (Fibres Division) would be glad to hear from any rugby men in the Company interested in playing.





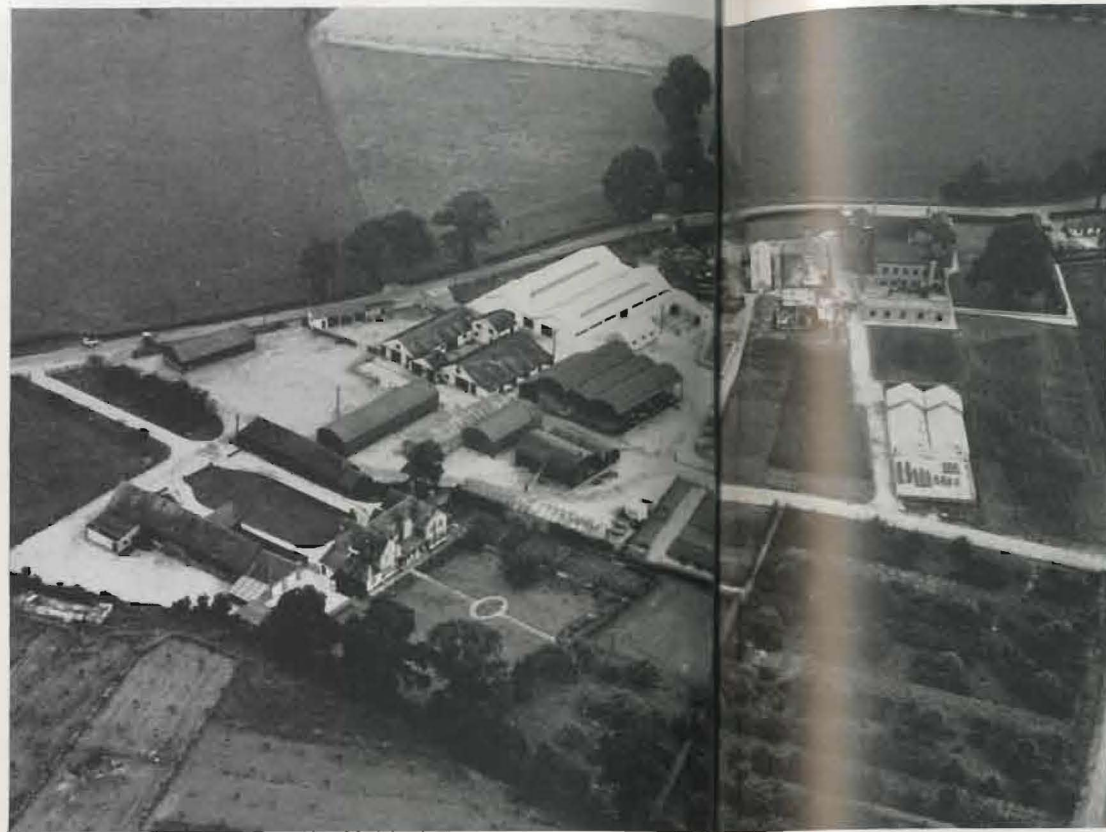
Mr. T. Storer of Lime Division's Tunstead Quarry recently completed 50 years' service with the Company. Our picture shows him (centre) receiving a letter of congratulation from Sir Alexander Fleck from Mr. F. C. Covill (right)



**Holiday hints.** This attractive and not too expensive luggage set is by Noton in I.C.I. cream Luxan grain 'Vynide.' Each piece can be bought separately and approximate retail prices for the various sizes are from £3 9s. 6d. for the motor case to £6 17s. 6d. for the lady's robe case. 'Plastishus' (below, left), new this spring, are children's sandals made from I.C.I.'s 'Welvic' P.V.C. compound. Available in a range of seven colours, they are washable, unaffected by sea water and sell at 5s. 11d. sizes 7-10, 6s. 11d. sizes 11-1, and 7s. 11d. sizes 2-5



**Successful experiment.** The new snack bar opened at Wilton Works that snacks and cold meals are popular. Now plans to extend the service. The first customer, Mr. J. McCullum, is served by Miss Joyce Rose



**Agricultural research station.** This aerial view shows I.C.I.'s Jeddott's Hill Research Station, Berkshire, where the research and development activities of Plant Protection Ltd. have been transferred from Fernhurst, Surrey. Departments previously at Bolton House are now located at Fernhurst.

**'Terylene' Show.** There was no lack of feminine interest when Miss Elspeth Thomas presented a 1920 style in 100% 'Terylene' satin by Teddy Tinling at Nobel Division's own 'Terylene' fashion show. All the models were girls associated with the Division headquarters or with the Glasgow Regional Sales Office



**The first bulk shipment of para-xylene from H.O.C.D. has been successfully delivered to a customer in Frankfurt, Germany.** Para-xylene, one of the two basic chemicals for terephthalic acid, from which 'Terylene' is made, solidifies at normal air temperatures, and a special Dutch ship and Rhine barge with heated storage tanks were used for this tricky cargo. Above: Loading in progress on Tees-side



## X-RAY CRYSTALLOGRAPHY

By John Wren-Lewis (Head Office Research Department)

*In simple terms, X-rays result from bombardment of matter by a suitable stream of electrons. It is over fifty years since this was first accomplished in crude form. Today X-rays are asked to do a lot more than show up simple silhouettes: they are asked to achieve no less than the scrutiny of the atoms that make up a particular piece of matter, thus revealing its identity.*

THE ordinary X-ray machine—the sort most of us have come across in hospitals or mass radiography units—cannot properly be described as a modern marvel, since even the most elaborate designs in use today are only improved versions of devices that have been in use since the first world war. It was indeed as long ago as 1895 that the German scientist Röntgen first discovered that an electric current passing through a tube nearly evacuated of air could produce a sort of invisible ray that would fog a photographic plate through an opaque covering. It was not so many years later that these discoveries began to be applied for getting photographs of bones or swallowed pins inside the human body, or of faults inside a piece of welded metal.

The really modern marvels using X-rays are scientific tools that use them in rather different ways—for studying, not the bones inside a body, but the arrangements of the atoms inside quite tiny specimens of matter.

To understand how this is done it is necessary first to remember that X-rays are vibrations of the same basic character as light, only with much higher frequencies. Light can be thought of as a sort of vibrating electro-magnetic field in space, with the frequency of the vibration determining the colour of the light. But there is another range of “invisible colours” below the slowest frequencies we can see (those of red light) and yet another range above the fastest we can see (those of violet light). And beyond the ordinary infra-red waves we find all the further ranges of radio waves, while way, way beyond the ultra-violet there lie the X-rays. They are produced by the vibration of electrons in metal atoms, and the X-ray machine generates them simply because the current passing through an evacuated tube at high voltage causes a beam of electrons (rather like the cathode rays of television sets) to bombard a suitable metal anode with sufficient energy to set the electrons in the metal atoms vibrating in the right way.

Now one reason why we cannot actually see the atoms composing a substance, even with a microscope, is that these atoms are too close together for the waves of ordinary visible light to be separately affected by them. X-rays, however, being of higher frequencies of vibration than ordinary light rays, have correspondingly more “compact” waves, or, in other words, shorter wavelengths.

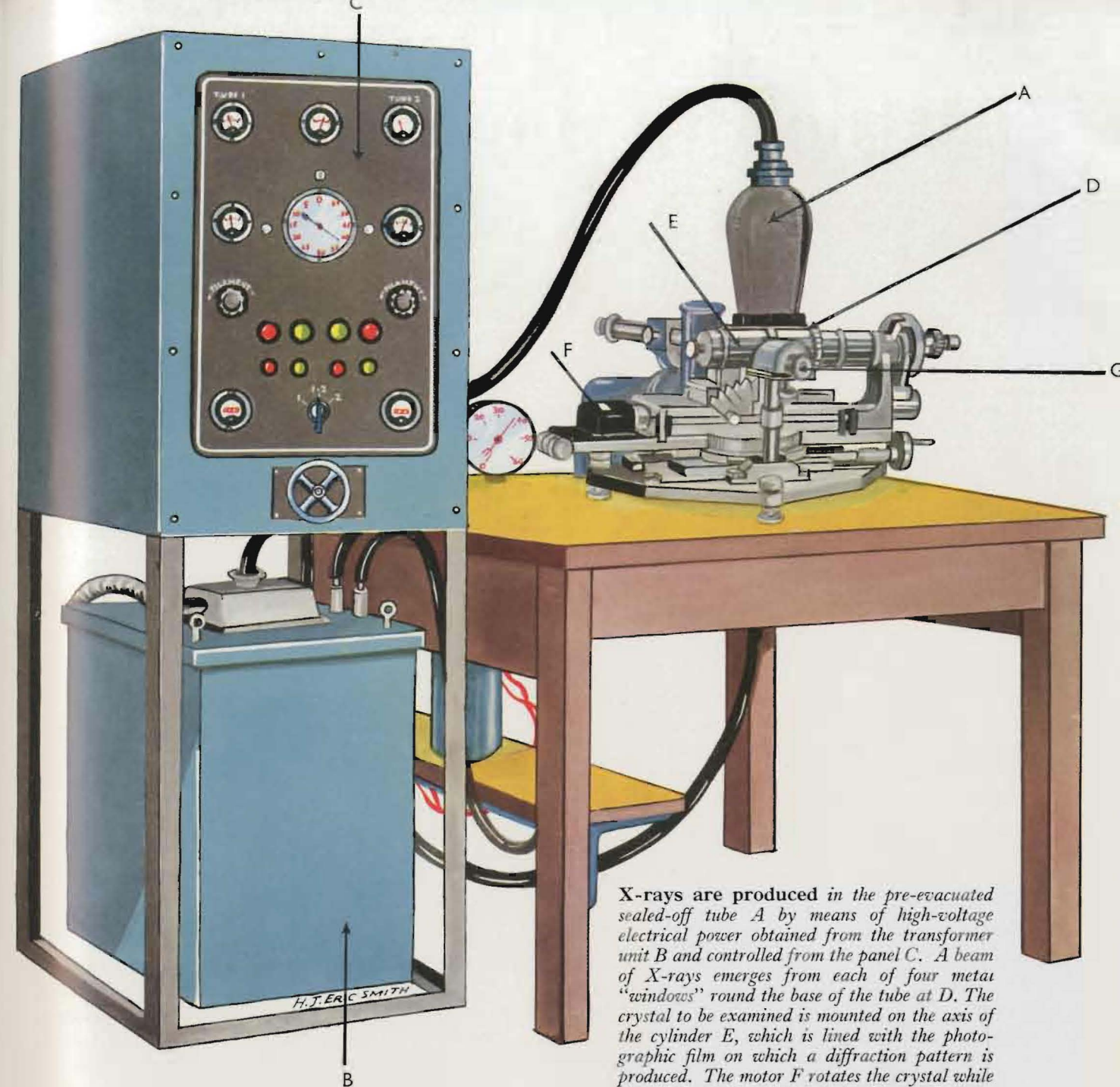
To be precise, we now know that neighbouring atoms in ordinary solids are separated by distances of something rather less than one-hundredth of a millionth of an inch. Ordinary light has a range of wavelengths between about twenty-four millionths of an inch (red) to about thirteen millionths of an inch (violet), but X-rays range from wavelengths of about one hundredth of a millionth of an inch down to only a fifth even of this incredibly small distance. It is because X-ray waves are as compact as this that they can go through materials which turn back ordinary light waves—and the very shortest X-ray waves can actually be separately affected by individual atoms as they go through.

Nevertheless, it is not possible just to photograph the atoms inside a material, because there is no sort of lens which will pick up X-rays, after they have been “scattered” by an atom, and focus them into an image. The ordinary medical X-ray is, after all, not a proper image photograph—it is a sort of silhouette produced on the photographic plate by the X-rays passing through the flesh; the bones, being denser, do not let X-rays through and so are silhouetted on the plate.

If we take a long-exposed close-up photograph of the rays that get through a material we do not get any pictures of the atoms—but we do get something, if the X-rays are short enough for the separate atoms to affect them. The different rays scattered by individual atoms interfere with one another as they come out of the material and produce patterns on the photographic plate or film, and from these it is possible to deduce things about general patterns of arrangement of the atoms in the material.

It is this process of deduction which constitutes the main part of the art or science of X-ray crystallography. It is called crystallography because the deduction cannot really go very far unless the material is one in which the atoms are regularly arranged, and such a material is called crystalline by chemists, even though from the outside it may not have the regular shape which we ordinarily associate with crystals. (Metals are crystalline, for example.)

It is, of course, the regular patterning of the atoms which does give ordinary crystals their characteristic shapes, and it has been known for a long time that the angles between the faces of a crystal are characteristic of its chemical composition: the shape is as it were a



X-rays are produced in the pre-evacuated sealed-off tube A by means of high-voltage electrical power obtained from the transformer unit B and controlled from the panel C. A beam of X-rays emerges from each of four metal “windows” round the base of the tube at D. The crystal to be examined is mounted on the axis of the cylinder E, which is lined with the photographic film on which a diffraction pattern is produced. The motor F rotates the crystal while the photograph is being produced. Preliminary adjustment is made using the microscope G.

large-scale expression of the way the tiny atoms are arranged inside. With X-ray photography (“diffraction” photography it is properly called) it is possible to detect crystallinity in specimens whatever their external shape, because the X-ray picture (or diffraction pattern) is in this case a pattern of distinct spots.

What is more, these spots are an exact representation of the way the atoms of the crystalline material are arranged. It is therefore possible to deduce the complete chemical structure of the material from them, which

sometimes cannot be found in any other way. Without X-ray crystallography, for example, the precise chemical character of some complicated substances—most notably penicillin and vitamin B<sub>12</sub> (the chemical which inhibits pernicious anaemia)—would probably not be known to this day.

The process of deduction is very difficult—far more difficult, in most cases, than the actual production of a suitable diffraction photograph by means of a machine like the one shown in the illustration. You can calculate

(Continued on page 209)



# Textile Printing in the East

By William Clarke (Dyestuffs Division)

Eastern traditions of textile printing are a craft requiring patience and skill; and the methods vary from one country to another. But Indian block printers, Javanese workers in wax and Thai screen printers all have one thing in common—they are long-standing customers for I.C.I. dyes.

THREE main types of textile printing occupy the bazaar craftsmen of the Far East. I have often watched with admiration the care and patience with which these craftsmen work—in India, in Thailand and in Java. In India block printing and screen printing are practised—the latter is found in Thailand, too; in Java, batik printing (which I will explain later) is the rule, although screen printing is also becoming established.

The Indian block printer uses by far the oldest implements encountered in the bazaar crafts. His blocks are like fairly large stamping devices and are said to resemble those used in ancient Egypt. It is easy to state that the block is made from a flat piece of wood of suitable size and weight, carved and chipped until it carries the design raised on its surface, one block being made for each colour on the design. It is easy to state all this; in practice the manufacture of blocks capable of producing saleable cloth calls for considerable patience and skill. Indeed, in Northern India block-cutting is a trade separate from printing, and craftsmen start learning it at a very early age.

The printing operation, too, is easier to describe than to perform. Baldly stated, the block is pressed on a sieve smeared with thickened dyestuff paste, transferred to its appropriate position on the cloth, and tapped to get an even, yet crisp, impression. To see a bazaar printer at work is to realise at once the very considerable expertise necessary.

Typical products of the block printers of India are the gorgeous saris that grace the womenfolk, as well as handsome scarves and wraps and, less exotically, cotton bedspreads for the export market.

In Indonesia printing has evolved along the markedly different lines of what is called batik printing. This is a technique whereby patterned effects are produced by painting the cloth with molten wax and dipping it in a cold dyebath. The dye then "takes" on those parts of the cloth not protected by the wax. This method was first developed in Java. The wax used to be painted on entirely by hand with a *tjanting*—a tiny copper cup with a bamboo handle and a spout whose diameter varied with the intricacy of the design. The work was incredibly tedious, since each different colour demanded a separate waxing operation to protect dyes already applied. In the old days the daughters of the Javanese nobility would spend months making sarongs of incredible beauty and complexity of design—rather as their Western sisters occupied themselves with embroidery.

The *tjanting* is still used in hundreds of small batik factories in Indonesia. But nowadays the women workers only modify or fill in designs on cloth already printed under the wax technique by men using the *tjap*. This is a block which consists not of wood, but of copper strips skilfully hammered into intricate shapes and soldered on to a lattice framework. Waxing by a *tjap* requires both sides of the cloth to be



An Indian craftsman cutting a brown paper stencil for screen printing





**An Indian block printer at work.** *Some finished examples of block-printed saris can be seen in the background. His little finger is poised ready to position the block exactly just before it hits the cloth.*

printed separately; the very accurate left-hand and right-hand designs needed are obtained by sawing the original copper strip block accurately in half and fitting a handle to the opposite ends of each half. As in India, the making of the block is an art in itself, and a pair may take up to a month to manufacture.

In comparison with the skill required to make the

*tjaps* and to apply the wax, batik dyeing operations are somewhat mundane. Indigo is applied by attaching the sarongs to a frame and dipping them several times in very large dye vats. The indigo fermentation vats used require skilful control—although this is still conditioned by alchemy rather than by science! Rich brown and orange dyes—notably I.C.I.'s 'Brentasogas' and 'Icinsogas'—are traditionally used, and these are



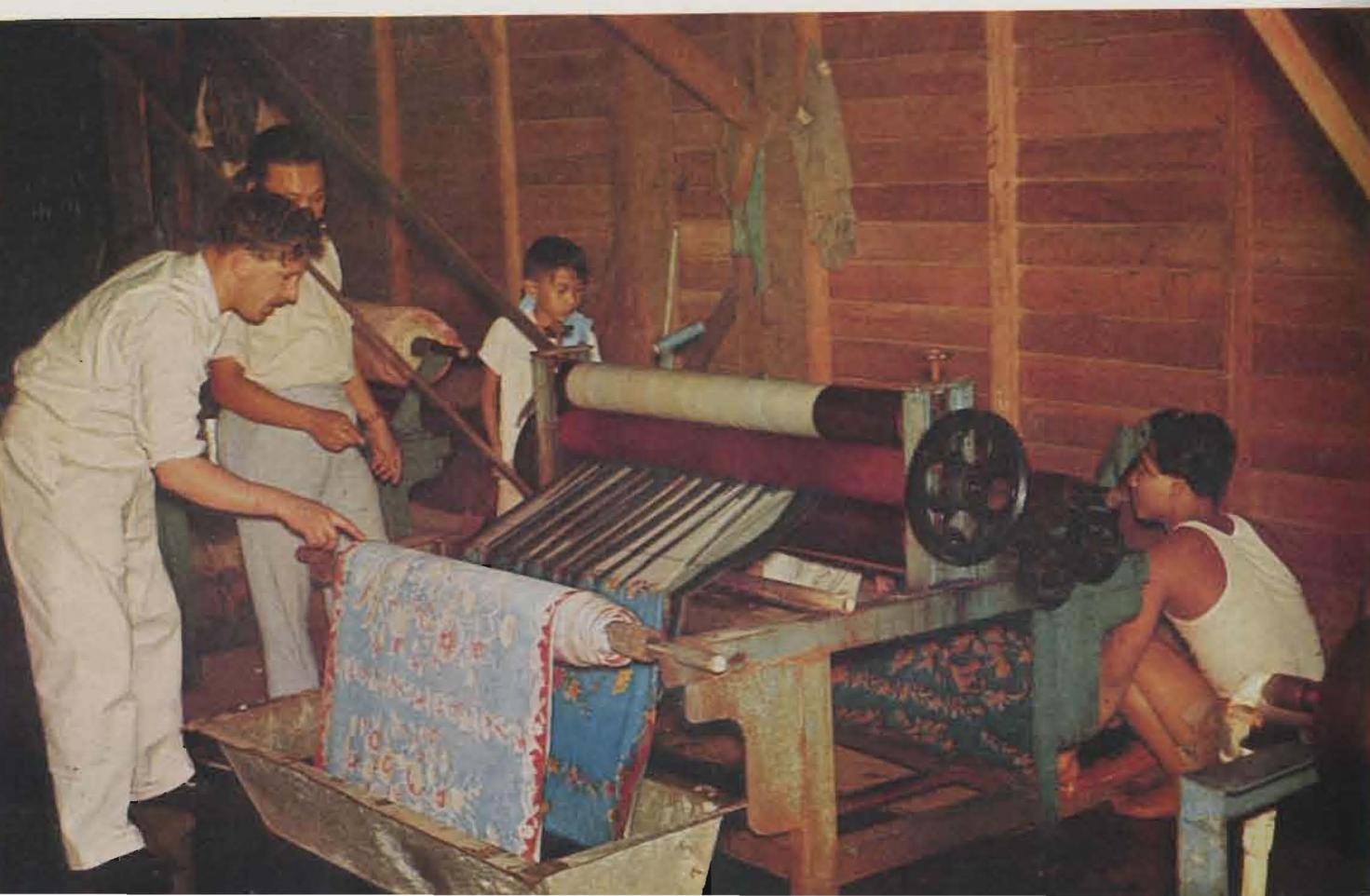
**A Javanese woman using a "tjanting" to wax over a cloth already partially printed.** *The wax protects the cloth in the dyebath so that the dye takes only where there is no wax, and thus a pattern is produced.*



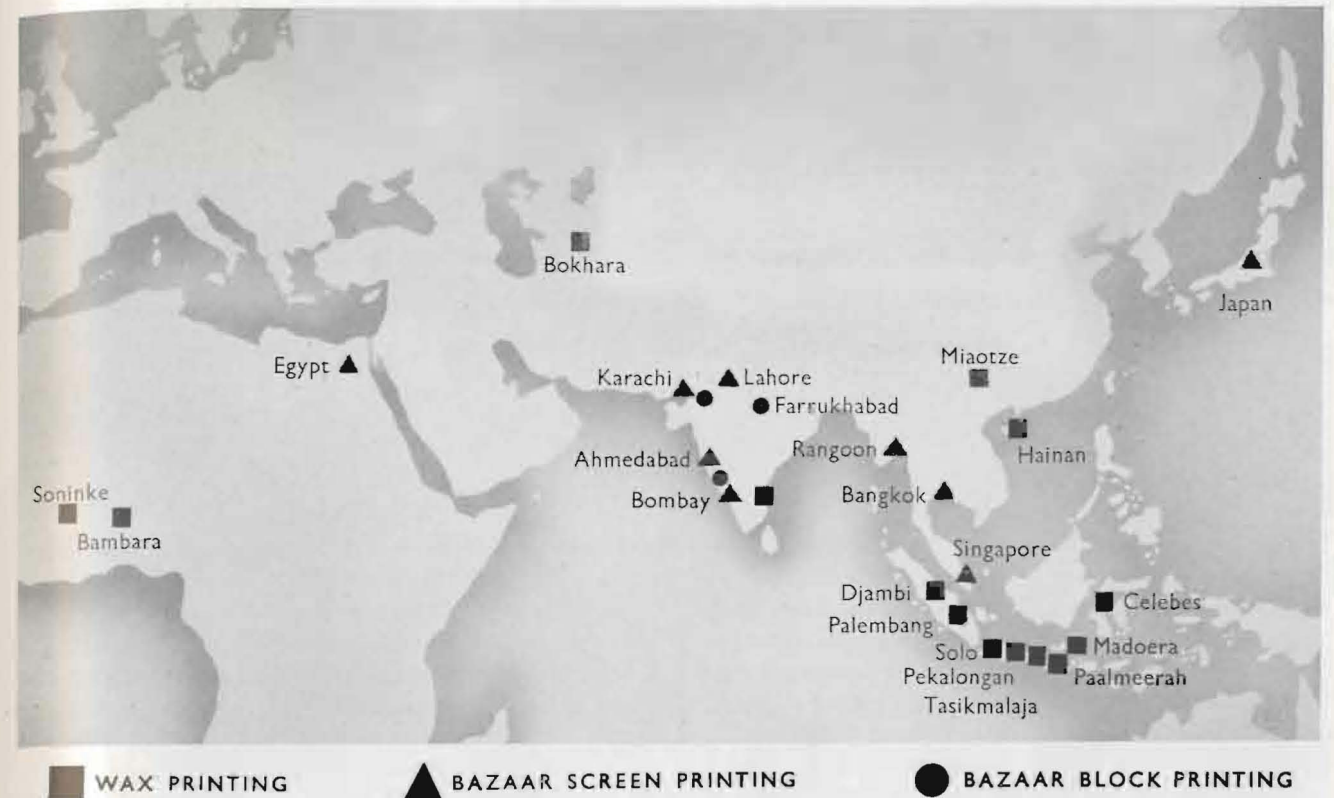


ABOVE: Thai girls hanging out sarongs to dry in the sunshine after dipping in the dyebath

BELOW: The author supervises the fixation of some of the first sarongs ever printed in Thailand with 'Procion' dyestuffs



## MAIN CENTRES OF CRAFT PRINTING OF TEXTILES



applied by working the waxed cloths in shallow concrete troughs containing the dyes, then piling them in heaps to drain or hanging them on bamboo rails to dry in the sun. When dry, the sarongs are rinsed in cold water, then dipped in boiling water to free them from the wax, which is skimmed off, collected, and cast into small blocks for re-use.

The third form of printing practised in the bazaars of the Far East is a relative newcomer known as screen printing. Originally Japanese, it was widely developed in Europe and America and is well known today in almost all the textile countries of the world. The Eastern bazaar craftsmen have taken the basic ideas of screen printing and modified them considerably to suit their own conditions and equipment—which, of course, vary from country to country.

In India a paper stencil is prepared by cutting out the design on brown paper previously coated on one side with a shellac-beeswax mixture; this is subsequently ironed on to a piece of silk or cotton organdie gauze tightly stretched and fastened over a wooden frame. The cloth is stretched to free it from creases and fastened down on a long table. A screen is then laid over the cloth and a little thickened dye poured

into one side of the frame. A rubber-bladed squeegee is then stroked across it and the dye is forced through the silk mesh in those places not protected by the stencil. Screen printing is much faster and much less arduous than block printing, and typical products include dress fabrics for saris and Western styles, and furnishing fabrics—wall hangings, sofa covers and the like.

Screen printers in Thailand employ unusually large screens, and the silk mesh is replaced by copper gauze. The design on the screen is painted on by hand with a thick bituminous varnish instead of using a paper stencil to block out the mesh, and some of the Thai screens can print a whole sarong in one operation. During a visit to Bangkok I had an opportunity to demonstrate Dyestuffs Division's new 'Procion' dyes to Thai screen printers. This particular expedition—by boat—to the customer was not without incident. Our tiny boat was almost swamped by the wash from a passing river steamer. Incidents like this are part of the day's work of selling dyes to the craftsmen of the East. Moreover, it all adds up to quite big business—in fact several million pounds a year.



# Central Council

By the Editor

The desirability of a further improvement in Staff Grade conditions, leave with pay for attendance at youth camps and a shorter qualifying period for works councillors—these were among the matters discussed at Central Council.

Sketches by Sallon

ONCE again Central Council held its spring meeting in the delightful surroundings of Scarborough in early May. Inevitably there is a certain sameness about these meetings, but none the less no serious observer can doubt their value. This report will be concerned only with the meeting itself. But that is only part of the story. A no less valuable part of Central Council business is the opportunity it provides for people to meet and say what is in their minds. The man on the shop floor can talk freely with the man at the top; and this can do nothing but good for both.

Perhaps the most interesting thing about this year's council meeting was the way the voting went on several controversial issues. Keenest debate of the day centred round various motions for an improvement in Staff Grade conditions, motions which were debated against the background of a rather stern warning from Mr. Grint, Chief Labour Officer, that a general advance on the Staff Grade front was unlikely until the problem of the high level of sickness absence (twice as high) among Staff Grade workers as compared with non-Staff Grade workers had been solved.

## Staff Grade Debate

The first resolution on this issue came from Plastics Division. Moved by Mr. Black, it simply asked the Company to improve the provisions of the scheme; and it was defeated by 71 votes to 65.

Next came a Billingham Division motion sponsored by Mr. Hutton, chairman of the workers' representatives, asking that "in certain cases and at the discretion of the Division Board acting on the recommendation of the Divisional Medical Officer" Staff Grade sickness pay should be extended from the present maximum of 26 weeks up to 52 weeks. This resolution was clearly framed so as not to involve management in an embarrassing rise

of costs at a time when costs are being very closely scrutinised. Mr. Grint in response to a question indicated that one could expect not more than about 500 people to be affected by the proposed reform. With the concession asked for being so clearly permissive rather than mandatory, the resolution was carried by 114 votes to 36.

Following this came another Staff Grade motion, also moved by Billingham Division in the person of Mr. Taylor. This proposed that sickness pay should be calculated according to a man's "average earnings for his normal job," the point being that it should take into account incentive bonus. Because about 40% of workers are not under incentive schemes, opposition became quickly evident. The opponents of the motion clearly felt that it was invidious to ask for a concession which would not apply to all. After some keen debate, the motion was lost by 119 to 48.

## Youth Camp Leave

Another interesting motion was that from Nobel Division (moved by Mr. Gooding) to the effect that members of the Boys' Brigade, the Girls' Guildry, the Girl Guides and the Boy Scouts be granted an additional week's leave with pay to attend camp, on the same lines as the leave now granted to members of pre-Service units. One of the principal reasons for asking for this concession was that in plants where there is an annual shutdown, very often this shutdown does not coincide with the date of youth camps. Hence many young people are prevented from attending. Clearly the motion commanded considerable sympathy.

Then Mr. Morgan of Paints Division made a speech which swung the meeting. His point was that youth organisations existed to train young people in the spirit of leadership, and that this spirit could only be achieved at some personal sacrifice. The motion was finally lost



HENRY  
MAXWELL  
(HEAD OFFICE)



LEN  
GROVE  
(METALS)



R.  
KEWLEY  
(GEN. CHEMICALS)



R.P.  
MCCULLOCH  
(METALS)



E.A.  
BLENCH  
(BILLINGHAM)



LORD  
ROCHESTER  
(ALKALI)



S.  
ALTY  
(ALKALI)





by 126 votes to 61, as was also lost an amended motion asking for additional leave *without* pay; but not before Mr. Grint from the platform had made the point that factory managers can, at their discretion, always give young people additional leave without pay provided this does not interrupt production.

### *A Controversial Reform*

A surprisingly lively turn to the meeting occurred over the seemingly mundane proposal put forward by Mr. Docherty of Wilton that the qualifying period of employment with I.C.I. for a works councillor should be reduced from three years to one. Mr. Docherty advocated this reform on the grounds that a year's employment was sufficient to acquire familiarity with the traditions of the Company. He won the best laugh of the meeting with his remark that to oppose this reform was closing one's eyes to progress like the man who read in *Reader's Digest* that smoking caused cancer of the lung, so he stopped reading *Reader's Digest*.

Mr. Bayly of Wilton, who seconded the motion, was impressive with his argument that the present system rendered too many people ineligible. At Wilton, for example, the average length of service of tradesmen was only two years and three months. Other speakers, however, notably Mr. Allardyce of Billingham (who came in for some hard knocks), were not so readily convinced, especially since it is only a few years since the qualifying period was cut from five years to three. In the end, Mr. Hutton of Billingham restored harmony by advocating the adoption of Mr. O'Leary's compromise that the qualifying period be made two years instead of the proposed one year. This amendment was carried by a large majority, but cannot become effective until confirmed at the next meeting.

### *Reports and Replies*

Much of the remainder of Council's business was taken up with reports and replies. Mr. Goodsell reported once again on the interesting experiment being conducted at Wilton for the payment of wages through a bank. Over 1000 payroll workers had opted for this scheme, and he expected that by the time next Central Council came round the number would exceed 1500. Bank charges had now been agreed at 10s. every six months per 30 cheques; and Mr. Goodsell pointed out that against this should be set the bus fares and wasted time which would otherwise have been incurred in a special journey to the works to collect pay after shift working. "A really wonderful success" was how Mr. Goodsell described the scheme.

A batch of Company replies to previous Council resolutions followed. Mr. Hill, head of Pensions Department, announced that there would be a freeze on any more alterations to the Profit Sharing Scheme until the spring

of 1962. Mr. Banks, Personnel Director, gave a sympathetic but decisive "No" to the resolution asking for an increase in the value of contributions to the Workers' Pension Fund paid before 31st March 1946. Mr. Grint said "No" to a request for an increase in the subsidy for safety footwear, pointing out that the price of safety footwear had risen by much less than general prices and wages. Mr. Grint also made a statement on canteen policy, announcing an increase in canteen prices of about 2d. per meal to cover the rise in the cost of food.

All this was preceded by the Chairman's most informative review of the past year's trading and of future prospects. Pointing out that our 1958 sales total would, in fact, have exceeded the 1957 total by about 2% if our interest in copper tubes had not been hived off and sold to Yorkshire Imperial Metals, he noted that this increase was none the less substantially below the increase of nearly 6½% in turnover which took place in 1957.

### *Fall in Profits*

Sir Alexander next drew attention to the Company's lower profits after tax (£17.6m. as compared with £22.1m. the previous year) and explained this fall as follows: "While the value of sales has remained almost the same as last year, the volume of sales has been spread over a larger number of plants, some new and some extended, but producing at a lower and hence more costly rate of output. This is an effect applicable to any highly capitalised industry, and especially to the chemical industry with its high degree of mechanisation and of instrumentation. If you operate a plant of that type designed to make 5000 tons a year of a product at an output of 4000 tons a year, you will probably still have the same number of men on the process. At the same time your other costs, apart from raw materials and services, remain much the same."

Commenting on the tendency to ever higher costs, he added: "We must all of us go out of our way to ensure, day in, day out, that the time and materials we spend on our job are used without waste and to the best possible effect. At the same time no unnecessary overhead charges must be allowed to go unchallenged. Only in these ways can we maintain a consistently high level of profitable activity."

The final business of Council was both sad and gay. Miss Bessie Webster of Central Labour Department, so well loved and long loved by those who attend Central Council, had made known that this was to be her last appearance before retirement. After valedictory speeches by Mr. Hutton of Billingham and Dr. Chivers of Dyestuffs, Sir Alexander Fleck presented her with two antique pieces of furniture on behalf of those present, and the delightful manner in which she replied touched the hearts of all.



# People and events . . .

## The Lightest Plastic ever Made

**P**LASTICS Division announced recently its plans for manufacturing the lightest plastic ever made—polypropylene. An agreement has been signed whereby I.C.I. acquires licences under the Montecatini and Ziegler British patents covering the production and use of this new plastic material, originally discovered by Professor Natta of Italy. Referring to these plans at Central Council last month, **Sir Alexander Fleck** described polypropylene as "a product with a very bright future, and perhaps the biggest single development in the field of plastics since polythene was discovered in the Winnington laboratories."

I.C.I. polypropylene, which is being marketed under the trade name 'Propathene', became available in substantial pilot quantities at the beginning of the month, and a full-scale plant is to be built at Wilton to be operated by Plastics Division which is expected to be in production towards the end of 1960. The new plant will bring I.C.I.'s total polyolefines capacity for 'Alkathene' and 'Propathene' to more than 100,000 tons a year.

To look at, 'Propathene' is very much like 'Alkathene,' but it is more rigid.



It can be moulded, extruded into film, or produced in the form of a man-made fibre. It was only five years ago that Professor Natta produced the first

solid form of polypropylene ever to be made, and although plants are now in production or under construction not only in Britain and Italy but also in the United States, Germany and France, polypropylene is still very much in the experimental stage. Some of its immediate uses will probably be for refrigerator doors, hospital utensils which need sterilising, toys, radio cabinets, door handles and paddles for washing machines, and, in film form, for packaging.

## Inside America

**I**N the last six months **Sir Alexander Fleck**, Chairman of I.C.I., has travelled well over 50,000 miles. In December he was in Australia for the opening of I.C.I.A.N.Z.'s new headquarters in Melbourne. During January and February he was with the Duke of Edinburgh in India and Pakistan. More recently he spent a fortnight in the United States at the invitation of the American section of the Society of Chemical Industry as their first Visiting Fellow. At a dinner in his honour held in New York Sir Alexander spoke on the British chemical industry in its world setting, and we plan to include this talk in next month's *Magazine*.

During his tour of over a dozen American chemical companies he flew nearly 7000 miles without once setting foot in public transport, for most big American firms run private aircraft to save travelling time in this vast conti-

nent. Our picture was taken on a flight from Denver, Colorado, to St. Louis, Missouri, in a Catalina amphibian, the personal property of the chairman of the Monsanto Chemical Company.

From Louisiana the Chairman made his first-ever helicopter flight to inspect and land on an offshore oil rig in the Gulf of Mexico when the guest of the Texas Company. Also for the first time he visited the Green River mine in Wyoming, the only mine in the world producing trona (sodium sesquicarbonate); similar deposits occur at Lake Magadi in Kenya, but here the trona is dredged up from the floor of the lake instead of being mined. The Wyoming mine produces about one-tenth of all the soda ash manufactured in the United States. Another stop was made at Midland, Michigan, home of the Dow Chemical Company. The Dow site is packed tight with plants, workshops and warehouses, covering an area of 2000 acres. Wilton is much the same size, but so far only 600 acres have been built over.

From the States Sir Alexander went on to spend several days with Canadian



*Sir Alexander Fleck photographed in the observation "blister" of a Catalina amphibian*

Industries Ltd. before returning home. He visited the 'Terylene' and ammonia plants at Millhaven, the ammunition works at Brownsburg, and the chlorine and caustic works at Shawinigan. The last time he had visited Shawinigan was on his very first trip to North America 35 years ago, when he went to see the hydroelectric power station on the site of the once famous falls.

## Ulster 'Terylene' Plant

**I**N March last year the Company announced that it had undertaken to build its next 'Terylene' spinning plant in Northern Ireland as and when the development of the market for 'Terylene' made it necessary. The first steps have now been taken. Negotiations were recently completed for the purchase of options on 200 acres of land between Carrickfergus and Kilroot in County Antrim. Construction work will probably begin on the new plant during 1961 with a view to starting production in 1964.

## Witness in the House

**I**T is not every day that a member of I.C.I. finds himself appearing before a select committee of the House of Commons and being examined by such an eminent barrister as Mr. Geoffrey Lawrence, Q.C., and being cross-examined by other well-known counsel. It happened recently to **Mr. R. E. Newell** and **Mr. J. Hughes**, Managing Director and Technical Director respectively of Wilton Council. A committee of two Conservative and two Socialist M.P.s was sitting to consider the application of the Tees Valley and Cleveland Water Board for authorisation of Parliament to construct a new £4 million reservoir on a tributary of the River Tees.

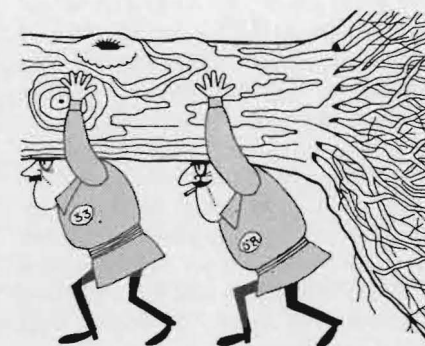
Billingham Works and Wilton Works between them consume more water of drinking quality than is required to meet the needs of a large county borough, and this makes I.C.I. far and away the largest of the Water Board's customers. That is why the Water Board asked Mr. Newell and Mr. Hughes to give evidence before the House of Commons Committee not only of the Company's present water problems on Tees-side but also

about the large extra supplies which will be needed in the future if the Company's activities there are to go on expanding according to plan.

What is it like to be a witness? Mr. Hughes likened it to a game of cricket, with the barrister standing in place of the bowler and the witness as the batsman wondering what sort of ball is coming next. But here the analogy rather breaks down, for the witness can be bowled several times before cross-examining counsel lets him go back to the pavilion. And dominating everything is the knowledge that in giving evidence you are not so much playing for your side as helping the committee to decide what to recommend to Parliament. For this is Parliament making laws.

## Paris Floralties Successes

**R**EADERS may be interested to learn that the Gardens Department at Fernhurst played an important part in supplying plants for the British exhibit at the International Flower Show held in Paris at the end of April. Plants for the exhibit were provided by more than fifty of Britain's leading nurserymen and private growers, including the royal nurseries at Windsor.



The main Fernhurst contribution consisted of two hundred saintpaulias (African violets). Some of these were staged in a group of specialities of British horticulture and secured an award as the best saintpaulias in the show. Others were included in an exhibit of orchids and other greenhouse plants. This display, which won a grand prix for Britain, was the work of Mr. Tom Rochford, a well-known Lea Valley grower, and **Mr. Jim**

**Middleton**, who has been in charge of the gardens at Fernhurst since 1946. It was in fact modelled on the lines of the tropical house at Fernhurst, and a special consignment of selected branches of Fernhurst oak trees was shipped over to France to provide the framework for the lifelike arrangement of exotic orchids and foliage plants.

## Addresses Galore

**W**ITH Southern Region's move from Gloucester House to its new Holborn home, Templar House, and the rustication of Plant Protection Ltd.'s headquarters (formerly at Bolton House) to Fernhurst, I.C.I.'s withdrawal from the West End is complete. That is unless you are going to count a small Fibres Division office in Bruton Street in the heart of the *haute couture* world.

Only ten years ago the picture was very different. Most of Imperial Chemical House was still in the hands of the Ministry of Works. The I.C.I. Board was located at Nobel House in Buckingham Gate. Head Office departments were scattered piecemeal over the West End at about ten different addresses, with outposts in the City, Belgravia and Earlsfield. Central Staff Department shared 2 Grosvenor Place with Pensions Department and Central Labour Department. Southern Region were, of course, at Gloucester House, with Safety Department up the road at 49 Park Lane. The *Magazine* office was at 26 Dover Street; other sections of Publicity Department were housed in Curzon Street Schools, Bolton House and 42 Hertford Street. Further north there was Stock and Share Department at 34 Portland Place. And so the list goes on.

Why did Southern Region have to move from Gloucester House? It was largely a case of the quart in the pint pot. Today there are some 600 inside staff compared with 359 in 1946. Why, too, was the name Templar House chosen for the new building? The continued use of the name Gloucester House was first considered, but rejected as likely to lead to confusion. Then Connaught House was suggested because the building is near the site at



## IN BRIEF

**Terylenity spreads East.** Over 8000 women behind the Iron Curtain will be wearing Leeds-made 'Terylene' wool skirts this year. An order for the skirts valued at £17,000 has been placed with the C.W.S. by the Hungarian Co-operative organisation in Budapest.

**Olympics "Possible."** A field representative of I.C.I.A.N.Z., **Mr. Trevor King**, has won selection for the 1960 Rome Olympics equestrian training squad. Nine riders have been chosen, out of which six will be picked for the Australian team.

**Chemicals from Coal.** One of I.C.I.'s deputy chairmen, **Dr. R. Holroyd**, is a member of the new committee set up by the Minister of Power, Lord Mills, to study processes for the conversion of coal to town's gas, oil products and chemicals.

**Gardeners' Sunday.** Over 400 garden enthusiasts braved the weather on 3rd May, when the grounds of Warren House, the Company's Staff Training Centre, were open to the public under the Gardeners' Sunday Scheme. The proceeds were given to the Royal Gardeners' Orphan Fund and the Gardeners' Royal Benevolent Fund.

**'Fluon' Prices Down.** The price of I.C.I.'s 'Fluon' polytetrafluoroethylene—the "slippery" plastic—has been reduced again. When 'Fluon' was first sold in 1948 the price was £5 a lb. Increased output has made possible price reductions to the present level of around 35s. a lb.

**Jodrell Bank Donation.** The Company has made a donation of £5000 to the University of Manchester's Jodrell Bank Radio Telescope Fund.

**Sound Driving.** Last year Wilton's long-distance lorry drivers covered over one and a quarter million miles and its rail operators handled nearly half a million tons. These figures were given by Mr. J. Grange Moore (Wilton Works and Personnel Director) when he spoke at the Works Transport Department's annual dinner. During the evening 62 of the long-distance lorry drivers received safe driving awards. Top of the list was Mr. F. K. Foreman, who received a 10-year safe driving medal.

one time occupied by the Royal Connaught Theatre, but again there was the risk of confusion with the better-known Connaught Rooms close by. Finally Templar House was approved. The historical association here is with the Knights Templar, who in 1118 built their first chapel and home between High Holborn and Chancery Lane.

## Sidelight on Safety

Is our safety target too modest? This was hinted at by the Chairman, **Sir Alexander Fleck**, in his speech to Central Council last month when he referred to the achievements in this field of our subsidiary company in Canada, C.I.L., which has a lost time accident frequency rate of 1.81. Their unit of measurement, he pointed out, is one million man hours in place of our one hundred thousand man hours, so that in our terms their accidents rate is less than 0.20 compared with the I.C.I. rate of 0.465. Their operations, though on a smaller scale than ours, cover much the same sort of industrial processes. Safety records put some of their plants in the top twenty of all North American chemical industry. When Sir Alexander was out in Canada just after Easter, C.I.L.'s largest works (so far as numbers are concerned), Brownsburg, had just completed no less than three and a half million man hours without an accident.

## 'Terylene' Patents Battle

It now seems almost certain that the legal battle over the extension of the British 'Terylene' patents is at an end and that their extension for another five years from July 1958 announced by the Patent Office in March will come into force. On one side, the owners of the patents, the Calico Printers' Association, backed by I.C.I., who have production rights for 'Terylene' throughout the world except for the U.S.A., had asked for an eight-year extension on the grounds that war and post-war shortages and difficulties—**J. R. Whinfield** and **J. T. Dickson** discovered 'Terylene' in March 1941—delayed the commercial exploitation of the new discovery. British Celanese, a subsidiary of Courtaulds, opposed any extension.

*The Times* had this to say about the Patent Office decision: "The need for rewarding research and invention—as well as development in which big risks are taken—must be recognised. So far ('Terylene') production has had a relatively short run in this country; the plants concerned started with a capacity of only about 11 million lb. in 1955 and reached 22 million lb. a

little later, which is less than half the production now planned. A further period of grace seems only just."

## Billingham Explosion Probe

FOLLOWING the explosion at the Ammonia-from-Oil Plant at Billingham on 21st April, in which three employees were killed, Billingham Division last month issued details of the exhaustive investigations now going on into the causes of the accident.

The investigation is in the hands of **Dr. P. W. Reynolds**, Deputy Works Manager of Gas and Power Works, and he is working with a team of more than twenty scientists and technicians. Within forty-eight hours of the explosion three experts flew in from the United States and were ferried to the R.A.F.'s Middleton St. George airfield by chartered plane, and two other American experts from London joined the team. Explosive experts from Nobel Division have also been called in to assist, and Professor Dudley Newitt, Head of the Chemical Engineering Department of the Imperial College of Science, London, has joined the team as an independent investigator.

\* \* \*

Although the explosion was of considerable violence, it wrecked only a small part of one of the six plants in the Oil Gasification Unit. The plant where the explosion occurred had not been in commercial production. It was being started up and had been in partial operation for several days before the accident. It is equipped with instruments for continuous recording of every aspect of the process, and examination of these records has so far shown that the plant was operating normally at the time of the explosion. The investigation continues.

## Exchange with the G.P.O.

TWO I.C.I. men, an engineer and a chemist, and two General Post Office men are changing jobs for about a year. This was announced in the House of Commons early last month by the Postmaster-General, Mr. Ernest Marples, who said he was indebted to the Board of I.C.I. for their co-operation in making the experiment possible. The Post Office is the first

Government department to make a two-way exchange of this kind with industry.

By comparison with the Post Office, which employs well over a quarter of a million people, I.C.I., the largest industrial firm in the country, is small beer. From the Company's point of view, therefore, there is a lot to be gained in our men getting an insight



into the way things are done in an even bigger concern.

The I.C.I. men chosen to take part in the exchange are 36-year-old **Mr.**

**G. P. Hall**, a section head in the Alkali Division Engineering Department, and 34-year-old **Mr. G. J. Richards**, head of the General Products Section at Dyestuffs Division Blackley Works.

Their opposite numbers from the G.P.O. are **Mr. D. Wray**, who since 1957 has been senior executive engineer responsible for the maintenance and operation of the B.B.C. and I.T.A. television networks, and **Mr. J. V. R. Birchall**, a principal in the Post Office's Establishments and Organisation Department. To begin with **Mr. Wray** goes to Central Instrument Section at Bozdown House and **Mr. Birchall** to Metals Division headquarters.

## Getting Ahead

"PROFITS are made by leading, by getting in first, and not by chasing the other fellow round the block"—**Sir Walter Worboys** (I.C.I. Commercial Director), speaking at the Advertising Association's annual conference.

## X-RAY CRYSTALLOGRAPHY (continued from page 195)

what sort of pattern you would get from a given atomic structure, but not usually vice versa. There is accordingly no alternative in most cases but to guess what sort of structure the chemical material you have photographed might have, calculate what your photograph would have been like if it had been this, see how the results compare with the actual spots you have got on your photograph, and then go back and modify your guess to allow for the discrepancies.

This laborious procedure will in most cases have to be repeated many times—sometimes as many as fifty times—before you get anywhere near an accurate correspondence between your gradually improved guess and reality. Since every calculation involves several hundred very complex sums (known as structure factor calculations and Fourier syntheses) it is not impossible for the whole process of interpretation to take several years, when getting the photographs and measuring them took only a few weeks!

It is not surprising that X-ray crystallographers have hailed with great hopes the coming of electronic computers, and a great deal of research is going on all over the world at the present time on the use of computers to speed up X-ray analysis—initially, just by calculating structure factors and Fourier syntheses automatically, but beyond that lies the possibility of getting help with the guessing work too.

These elaborate procedures are not always necessary, however. If the substance under analysis is one which someone somewhere has already analysed by other means, one can use the X-ray machine to identify a chemical substance without the full work of structural analysis. In such a case an X-ray photograph of a powdered specimen (in which a very large number of small crystals are all crushed up together at all sorts of angles with one another) produces a picture containing rings rather than spots, and these rings are characteristic of the substance in much the same way as the angles between the external faces of a single crystal are. The American Society for Testing Materials has built up a vast index of the characteristic ring patterns of known substances, which makes X-ray powder crystallography a very widely used tool today.

Two of the world's most famous X-ray crystallographers work in I.C.I. **Dr. C. W. Bunn**, now in the Research Department of Plastics Division, played a leading part just after the war in elucidating the structure of penicillin (he was then at Alkali Division), while **Dr. A. F. Wells**, who has been for many years in the Research Department of Dyestuffs Division, has made notable contributions to the theory of the subject. Both men have written text-books which are regarded as standard works.

## APPOINTMENTS

Some recent appointments in I.C.I. are: **Billingham Division:** **Mr. J. L. Tedbury** and **Mr. J. H. Townsend**, Visiting Directors. **Dyestuffs Division:** **Mr. G. W. Innes** Visiting Director. **General Chemicals Division:** **Mr. W. G. C. Cashford**, Visiting Director; **Dr. V. G. Cave**, Rocksavage Works Manager; **Mr. A. V. Johnston**, Division Labour Manager. **Heavy Organic Chemicals Division:** **Dr. J. Clark**, Visiting Director; **Mr. A. B. Goggs**, Group Manager in the Research Department; **Mr. F. E. Stewart**, Division Assistant Accountant (in addition to **Mr. F. J. K. Hillebrandt**). **Metals Division:** **Dr. A. D. Lees**, Visiting Director. **Paints Division:** **Dr. W. A. Caldwell**, Visiting Director; **Mr. T. R. Greig**, Production Department Manager. **Pharmaceuticals Division:** **Mr. S. Howard**, Visiting Director. **Plastics Division:** **Mr. E. Hodgkin**, Visiting Director. **Wilton Council:** **Mr. C. M. Jennings**, Visiting Director. **Canadian Industries Ltd.:** **Mr. R. B. Winsor**, Vice-president.

## RETIREMENTS

Some recent announcements of senior staff retirements are: **Head Office:** **Mr. A. Lyons**, Cost Controller, retired 30th April. **I.C.I. (Brazil):** **Mr. G. A. Bailey**, Director, retired 1st May. **I.C.I. Pakistan:** **Mr. L. G. O'M. Irwin**, Sales Director, retired 12th April.



# Name, Rank and Number

By Roy Shirley

*Illustrated by Arthur Horowitz*

IT was around midnight when the train jerked to a final halt at a small siding just outside Frankfurt, and we dropped clumsily down from the wagon on to frozen snow, the staccato barking of the guards herding us into line to be counted before going on.

We moved out of the station into a world of white ruin, incredulous even in our apathy. There wasn't an undamaged building to be seen—only snow-covered mountains of rubble and the empty shells of burnt-out houses standing in feeble, derelict confusion.

We quickly lost interest in the scene, straggling onwards in an untidy shuffling column, the newly fallen snow crunching icily beneath our tired steps, the silence broken only by weary fragments of blasphemous conversation.

I glanced sideways at Jimmy, an air gunner, and tried to grin. He had flak splinters in his left foot and I had back injuries after being shot down in a daylight bombing raid on the Cologne marshalling yards.

"I thought senior N.C.O.s were always entitled to transport under the Geneva Convention," I said humorously.

"These —s can't read," he grunted wearily. "How's the back standing up to it?"

"Not too bad. Wonder how much further this place is?"

"Spider reckoned he heard one of the goons say it was about twelve kilometres."

"Oh, —!" I said feelingly.

Spider was an American Air Force fighter pilot who spoke fluent German. He was six feet six inches tall and thin with it—that's why we called him Spider.

The moon threw a ghostly aura of light over the jagged landscape as we struggled laboriously on through the bitter night, sometimes staggering in our weakness—and always the senseless shouting of our captors, urging us impatiently forward—the rear of the column now straggling, then closing up under a scuffling of swinging rifle butts.

All sense of time long gone, we suddenly brought up in a shambling halt on the edge of a clearing.

Lying back off the road was a grim, unyielding building surrounded by a high wall with barbed wire entanglement running along the top. Searchlights moved methodically over the whole area, and looking up at the lofty guard towers I caught the metallic glint of the guards' helmets and the heavy machine-guns.

Inside the prison we were split up and taken one by one into a large, sparsely furnished room with heavily barred windows.

A Feldwebel looked up from behind a long trestle table and gave me a hard-eyed stare. Two corporals stood stolidly at his side. "Remove your clothes!" he said in precise English.

I remained for a moment without moving.

"Undress!" he rapped out sharply.

I started to remove my clothes with automatic fumbling gestures and the two corporals went through



*. . . the silence only broken by weary fragments of blasphemous conversation*

each article of clothing carefully as I discarded it, until I was finally completely naked. Afterwards I dressed quickly, the first feelings of bitter hatred stirring within me, remembering the loss of dignity in the defiling search of my body.

I finished dressing and two guards appeared suddenly, marching me out of the room and along a narrow corridor with cell doors on either side. We stopped abruptly while one of them unlocked and threw open a door, pushing me roughly inside. The door slammed behind me and the sound of their heavy tread slowly faded, leaving me in silence.

I looked quickly round the cell, my eyes lighting on a jug of cold water and a hunk of black bread. I tore the bread apart, wolfing it down voraciously, and swallowed the icy water with breath-taking gasps. Ah, that was good—better than anything I had ever eaten before in my whole life! I felt a nagging desire for a cigarette and got up to look round the cell. It was about eight feet long, five across, and roughly

nine feet high; the only furniture was a small table and bed with wooden slats holding a straw palliasse and one blanket. Under the heavily barred, frosted and reinforced glass window stood—incongruously—a metal radiator which was cold.

I lay back on the palliasse, suddenly tired, drawing the blanket over my face to shut out the light—indifferent to my fate now—just so long as I could sleep.

It was daylight when I awoke to the sound of doors slamming nearby, and I sat up with an involuntary start of apprehension. The sounds drew closer, and I stood up as a key grated in the lock and the solid door swung open.

A guard slid a tin plate on to the floor with two thin slices of bread and a mug of ersatz coffee, while another stood squarely in the opening nursing a sub-machine gun. He stood looking at me without expression until the first guard withdrew and the door slammed shut. I bent down stiffly and picked up the



food, eating the bread and swallowing the tasteless coffee slowly, warming my hands on the mug.

A small printed notice above a red metal lever on the door caught my eye, and I moved closer to read the words "Pull lever down to summon guard when needing to visit lavatory." I reached up and pulled the lever. The *Abort* was the other side of the corridor almost opposite the cell door, and I attended to my needs in embarrassed silence with my escort looking on.

Back in the cell I lay down on the bed and closed my eyes. I was slowly drifting into sleep when the door was suddenly flung open with a crash that brought me to my feet, and the guards were standing in the entrance.

"*Raus! Raus! Kommen sie mit uns!*" one of them said sharply.

I followed them into the corridor, waiting while the door was shut behind me—then we marched in silence along various passages and stopped outside a large, black-painted door. The room inside was bright, the inevitable bars at the windows covering one wall, and a wall map, complicatedly flagged, on another. A Luftwaffe Oberst sat behind a polished mahogany desk angled in the corner.

I came to attention in front of the desk and heard the door close quietly behind me as the guards withdrew. I remained at attention before the desk and waited for the Colonel to speak. He glanced up from the notes he was scribbling and smiled boyishly. Average build, fair hair partially grey, blue eyes—he looked to be in his late thirties.

"Ah, yes, Flight Sergeant Shirley. Please sit down. I won't keep you long—just get rid of this bumf." He was still smiling pleasantly and I was taken aback by his casual English slang. I sat ill at ease on a wooden chair, facing him across the desk.

He flung down his pen with a quick gesture of relief and reached for a nearby file. He studied it briefly and looked up. "Right-ho, Flight Sergeant, this won't take long. Your full name, rank and service number, please." I answered quietly, the familiar words sounding strange to my ears in the enemy surroundings.

"You were lucky to get away with it when you pranged Köln Nippes, you know," he said easily.

"A lot of your chaps bought it that day." I said nothing, and he went on conversationally: "Good kite, the Lanc—your radar gear must have been spot on—but no fighter escort!" he whistled through his teeth slowly. "No future in that at all!"

He shook his head with a grin of sympathy and picked up his pen. "What squadron were you with, Flight?"

"I'm sorry, I am only permitted to give you my name, rank and number, sir." I was glad to hear my voice sounding clear and steady.

He studied me closely and I fixed my eyes resolutely at a point over his left shoulder. His hand moved towards the flap of his pistol holster and my gaze dropped to the sleek gleam of oiled metal. He was no longer smiling, and the round black muzzle of the Luger threw my stomach muscles into sharp contraction.

"We are not playing games, Flight Sergeant," he said bleakly. "Stand up and walk to the window."

My throat dried and I tried to swallow as I moved automatically across the room towards the window, and I felt that terrible trembling beginning to possess my limbs as it had during the final minutes in the aircraft before it crashed.

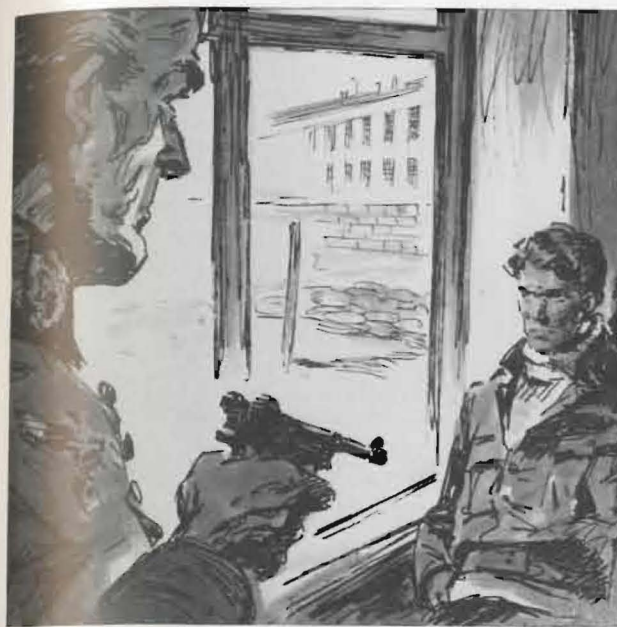
Outside, stacked against the wall of the courtyard, was a deep banking of sandbags with a single wooden post standing a few feet out from the centre.

I forced myself to still the trembling, my mind desperately trying to reject their obvious purpose—eddies of fear fading, then surging back, fragments of half-forgotten intelligence lectures drifting through. "There will probably be threats—about being shot, or tortured by the Gestapo—but we are quite confident that these threats are not carried out. So keep your head—don't panic . . . quite confident . . . not carried out . . . it is your duty . . . only name, rank and number . . ."

"Go back to the chair!" The hard, curt tones cut savagely into my blurred thoughts, and I was grateful for the support of the seat again. The Oberst had not moved—the pistol muzzle was steady with violent purpose.

"Now, your squadron and the name of your commanding officer."

Oh God! How frightened I am! It must show—my eyes—my face.



*. . . My gaze dropped to the sleek gleam of oiled metal*

I heard my voice answering from a distance. "I don't know." Don't know? Don't know? Why did I say that? Must keep calm.

"What are you smiling at, my young friend?" His voice mounted angrily.

Smiling! Was I smiling? I didn't feel as if I were smiling. I must be a bit round the bend.

He came round from behind the desk with astonishing speed and hacked my shins viciously with his toe cap. I gave a yell of agony and surprise and fell off the chair on to the floor. A torrent of screamed abuse filled the room, and then the guards were suddenly inside—jerking me to my feet, stolidly acknowledging his frenzied commands as I was hustled outside.

Back in the cell I sat shakily on the bed, the sound of the guards' footsteps fading until I was left in silence. A little later the footsteps returned and the door opened quietly. Some cabbage soup and black bread were slid inside, but it was cold by the time I had controlled myself sufficiently to eat.

Night fell and passed, and a succession of days and nights followed without my seeing anyone except the guards who brought food three times a day and escorted me to the lavatory across the passage.

After a week had passed in this way I was suddenly taken out and again marched along the labyrinth

of corridors until we stopped at the same black door of a week previously. The same Colonel was seated behind the desk, and I remained at attention until he looked up and briefly gestured towards the chair.

He eyed me for a long time before speaking. "You have had time to consider your position, Flight Sergeant," he said at length, "and I hope you are now prepared to be sensible."

He broke off and threw me a cigarette, leaning forward with a slim gold lighter. I drew deeply on the cigarette, grateful for its immediate comfort.

He smiled pleasantly before going on. "You must understand that I personally bear you no ill feelings, but these routine matters have to be checked here—just for the records. When one of you chaps refuses to co-operate it makes things awkward for me keeping the Gestapo quiet." He fluttered his hands deprecatingly towards the ceiling. "I haven't always done this job, you know—used to fly Heinkel 111's in the Battle of Britain, and I've not forgotten what it was like on the bombing run." He tossed me another cigarette and lit one for himself before continuing.

"Of course," he said reflectively, "I was a bit older than you at that time—it can't be much fun for a boy like you riding a cookie over Berlin." He shook his head and wagged his finger playfully. "No life insurance in that, eh?"

I felt slightly dizzy with the effect of the two cigarettes after a long spell without any, and the room felt uncomfortably warm.

"Anyway, as I say," he went on with a frown, "if you don't co-operate with me in keeping our file records in order the Gestapo will remove you from the Luftwaffe's protection, and there will be nothing I can do to help you then." He stubbed out his cigarette abruptly. "Now, tell me the name of your commanding officer and the squadron."

I cleared my throat and spoke quietly. "I am not allowed to give you any information other than my name, rank and number, sir. If I did, when I returned to my unit I would be shot," I concluded with dramatic invention.

He eyed me narrowly and stood up slowly. "Very well; there is nothing more I can do. The Gestapo will be here for you in the morning. You are a



nice-looking boy now, but you will not be very nice to see when they have finished with you. You are a fool!" he ended dispassionately.

Back once again in my cell I lay on the bed staring at the ceiling and wondered what I would do if the Gestapo did arrive for me. I suddenly felt terribly tired, the weight of responsibility bearing down on me remorselessly, sick at heart with the whole situation. Why should it be me? I need never have been here or flown at all. Trying to be a — hero when I know I'm a coward. Hot tears of self-pity started to roll wetly down my face and a lump in my throat throbbed painfully.

When I awoke it was morning and I felt curiously stronger, mentally, in my bitterness. The guards brought "breakfast" as usual, and afterwards I sat on the edge of the bed waiting for the arrival of the Gestapo. The day dragged on—like all the other days—and night fell slowly.

A further week passed in this way, and I knew then that the Oberst was bluffing—I would not be handed over to the Gestapo. If this had been intended it would surely have been done before.

I lay on the bed most days, going through the alphabet and trying to recall the names of the fellows at school with me. Sometimes I ran through my mind what I could remember of Shakespeare; *Twelfth Night* had once been a favourite—and *Hamlet*. One day I recited the Soliloquy in loud, ringing tones, confusing the lines when memory failed me, and when the guards opened the door to see what the noise was about I bowed gravely.

Shortly after this the door opened and a heavily built man in civilian clothes stepped into the cell. The old inner trembling started up immediately, thoughts of the Gestapo crowding my mind unpleasantly.

He gave an unexpected, long-suffering sigh. "Hiya, kid!" He pulled out a packet of Lucky Strikes and pushed a cigarette towards me absently. "I'm the Red Cross representative," he drawled in a Hollywood American accent. "See all the noo guys when they come down—fix t'ings with the Jerries so they give you your Red Cross parcels. How they treatin' you here—O.K.?" He pulled out a form from a battered-looking briefcase and handed it to me without waiting for an answer. "Just fill it out—usual bull for the boys



"... They might be listening when we talk"

in Geneva—and I'll see you get some books to read and a food parcel. Here's a pencil. Be back in an hour—got some other noo guys to see now." He got up heavily from the bed and pulled down the lever to summon the guard. The door opened, and he left the cell with a casual flip of his hand.

I looked at the form. Under the large printed heading: "International Red Cross Society, Geneva, Switzerland," my eyes ran down the first half-dozen questions quickly. Name, Rank, Service Number, Squadron Number, Operational Base, Type of Aircraft, Number and Type of Engines, and so on. I read it through to the end, picked up the pencil, completed the first three questions and struck the remainder through with one long deliberate line, and lay back on the bed peacefully.

Some time later the door opened and the big civilian came in, glanced to the small table and picked up the questionnaire. He looked at it briefly and shrugged his shoulders theatrically. "Okay, kid—it's your own funeral if you don't get any parcels," he said sadly. I didn't answer, and he summoned the guard to let him out.

On the eighteenth day of solitary confinement the guards gave me the morning coffee and bread and motioned me to prepare to leave the cell. Shortly after this I was taken out of the prison, across the

snow-covered courtyard past the sandbagged wall and firing post, into a smallish area containing wooden chalet-like huts. We stopped at the first one and entered into a narrow corridor with a door opening off either side. The right-hand door was unlocked and I was led into a comfortable room containing two standard military beds with a pot-bellied stove glowing cheerfully between them. A blanket-covered table and two chairs stood in front of the only window, secured by the usual bars. The door closed behind me, and a figure seated on one of the beds stood up uncertainly. He was about my own build and perhaps a couple of years older. For a few moments we stared at each other without speaking.

"How long have you been here?" I broke the silence at last.

"I come today only," he answered after a cautious pause, and I noted the un-English delivery carefully. I sat down on the other bed and tested the springs. It was quite comfortable.

"You are English?" he asked quietly. I nodded in agreement.

"You do not look like English," he stared at me suspiciously.

I was suddenly conscious of my fair hair and blue eyes—the characteristic German combination—and grinned in amusement. "Come to that, you don't speak English with an Oxford accent," I said genially.

His wary expression remained set for a moment and then broke as we both dissolved into laughter. "I am French," he said, recovering, "with the Free French Air Force before shot down and brought here."

The atmosphere settled as we satisfied each other of our bona fides.

Midday came round and the guards came in with some food—beef, potatoes, cabbage, with bread and cheese and some passable tea. We downed this without further conversation and afterwards lay back contentedly on our beds.

I had a sudden recollection and sat up quickly, motioning him not to talk. "Listen," I whispered, "check and see if you can find a microphone—any wires, compris? They might be listening when we talk."

We went over the whole room thoroughly, and Michel (that was his name) tugged my arm and

pointed silently towards the twin stovepipes leading to the roof. One of the pipes was intensely hot, but the other was barely warm. We drew back from the stove quietly. "Yes," I murmured, "it's probably in the cold pipe. I can't see any reason for there being two pipes, and they will reckon on us sitting close to the stove." Michel nodded solemnly, and we both started giggling at the situation.

We subsided and he leaned his head close to mine. "We must say nothing—only what is bad about the Germans."

I raised my thumb and we both moved back to the stove and sat down on our beds. "Did you have that — of an Oberst interrogate you over the other side?" I asked in a loud voice.

"No, I had a Hauptmann ask the questions—he was a *cochon*, like most of them, *n'est-ce pas?*"

"This Oberst, he was a — liar. Said he'd flown Heinkels in the Battle of Britain—probably couldn't fly a kite in the park."

"Ah yes," Michel warmed to his part enthusiastically. "Not much good as airmen—run like the rabbits when the trouble starts!"

I broke into a fit of coughing, trying to stifle the mounting laughter. "Useless shower! Not like the Italians—if it hadn't been for the Italians they'd have lost the war long ago," I said, inspired.

That same night we were hustled surlily out of the hut by our guards and taken to the main transit section of the camp, where I learned from other prisoners who had also passed through interrogation that we would shortly be moved to a permanent camp.

The ebb and flow of a dozen barrack-room conversations washed strangely about my ears as I stood in the dim light of my temporary home, savouring the comforting warmth of so much human companionship.

Somebody came out of the gloom and handed me a cigarette. It was Jimmy! "Kept you over there long enough," he said with a grin. "Been giving them your life history?"

I sat back on my bedding in quiet contentment while he went on, listening to his news, the latest rumours, what the permanent camp would be like and how long before we would be given a Red Cross parcel.

It was good to be back.



